

(12) UK Patent Application (19) GB 2 271 452 (13) A

(43) Date of A Publication 13.04.1994

(21) Application No 9319799.4

(22) Date of Filing 24.09.1993

(30) Priority Data

(31) 9220232

(32) 24.09.1992

(33) GB

(51) INT CL⁵

B07C 3/18 3/14 , G06K 1/12 7/00 17/00 19/06 , G09F

3/02

(52) UK CL (Edition M)

G4H HGM H1A H13D H14A H14D

B8F FBG

U1S S2120 S2268 S2272 S2291

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(58) Field of Search

UK CL (Edition L) B6F FAB FAC FAD FAE FAF FAG

FAH , B8F FBG , G4H HDC HDD HDR HDS HDT HDU

HDV HDW HGM

INT CL⁵ B07C 3/00 3/18 , G06K 1/12 , G09F 3/02

(54) Mail source encoding device

(57) An integrated postal mail encoding device which on input of addresses determines national and international postcodes and prints the address, origin and postal rate in human readable and machine readable form on a postage stamp 36. The device independently communicates the codes to sorting office computers enabling monitoring of fraudulent use of the encoded stamps and enables all mail to be sorted automatically.

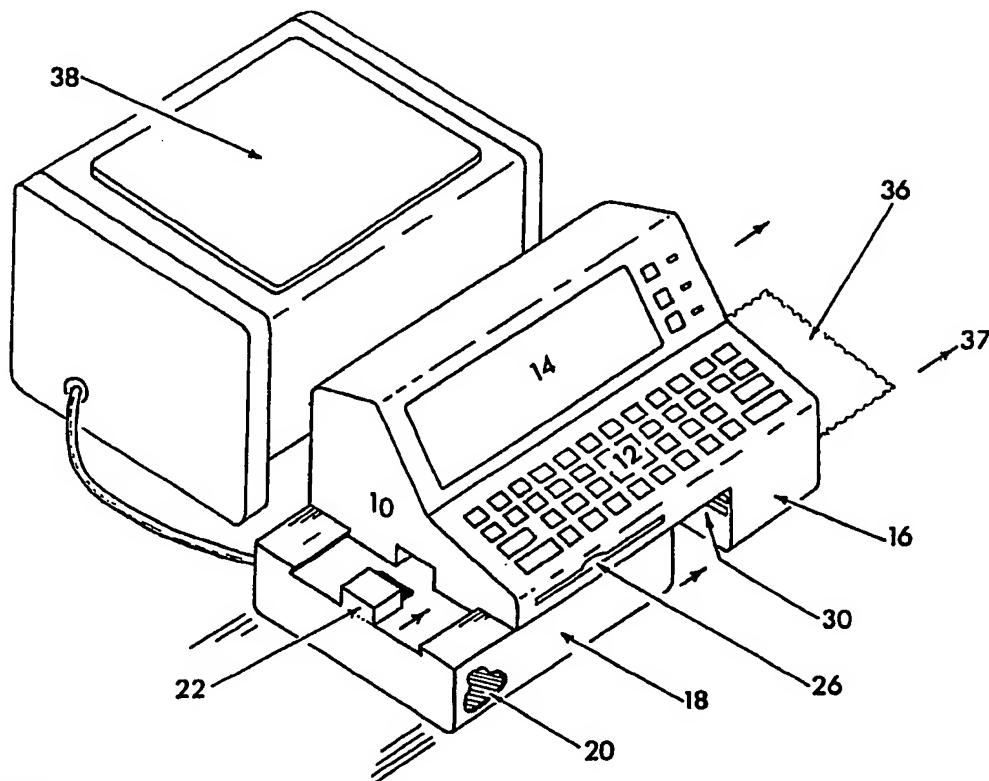


Figure 1

GB 2 271 452 A

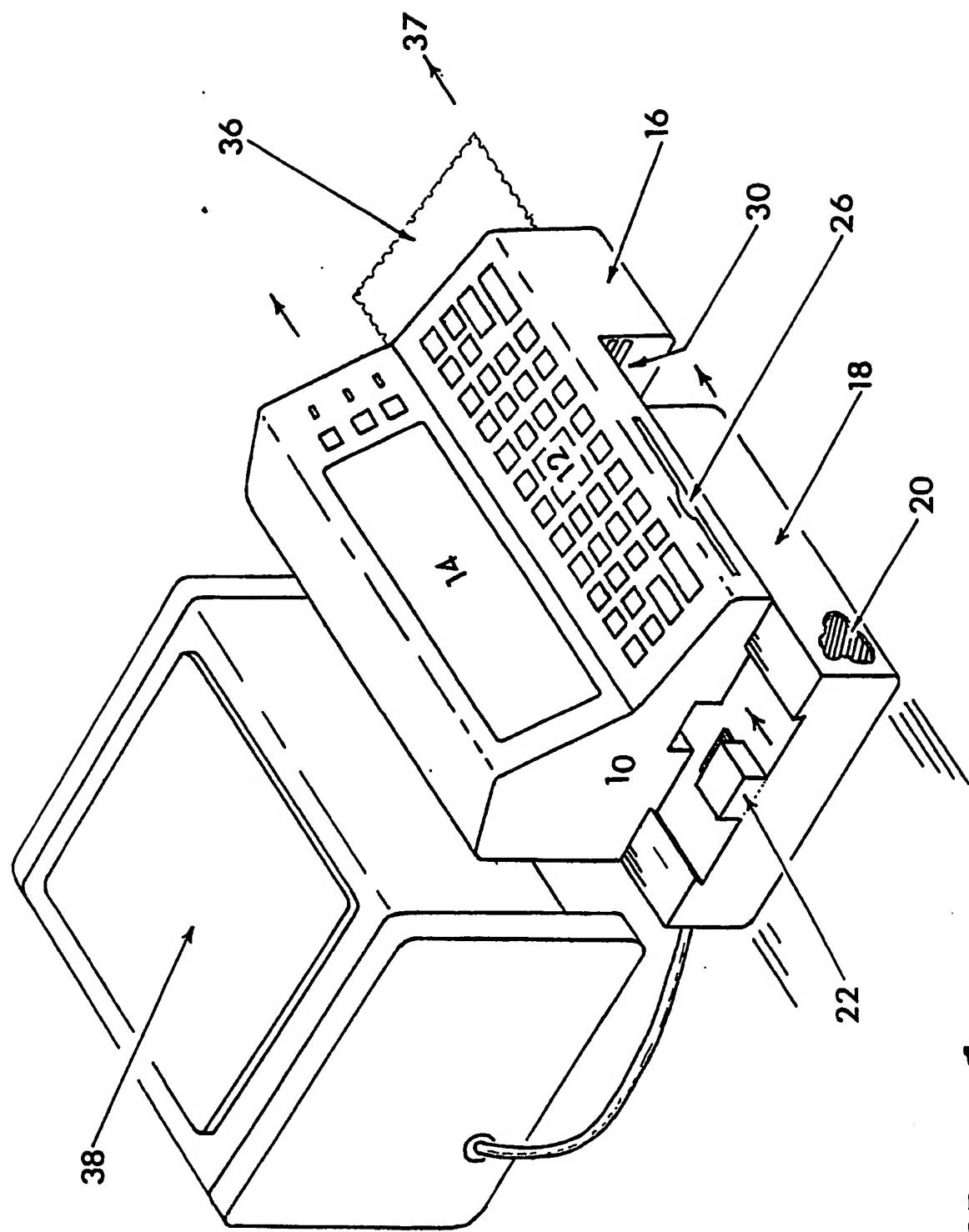


Figure 1

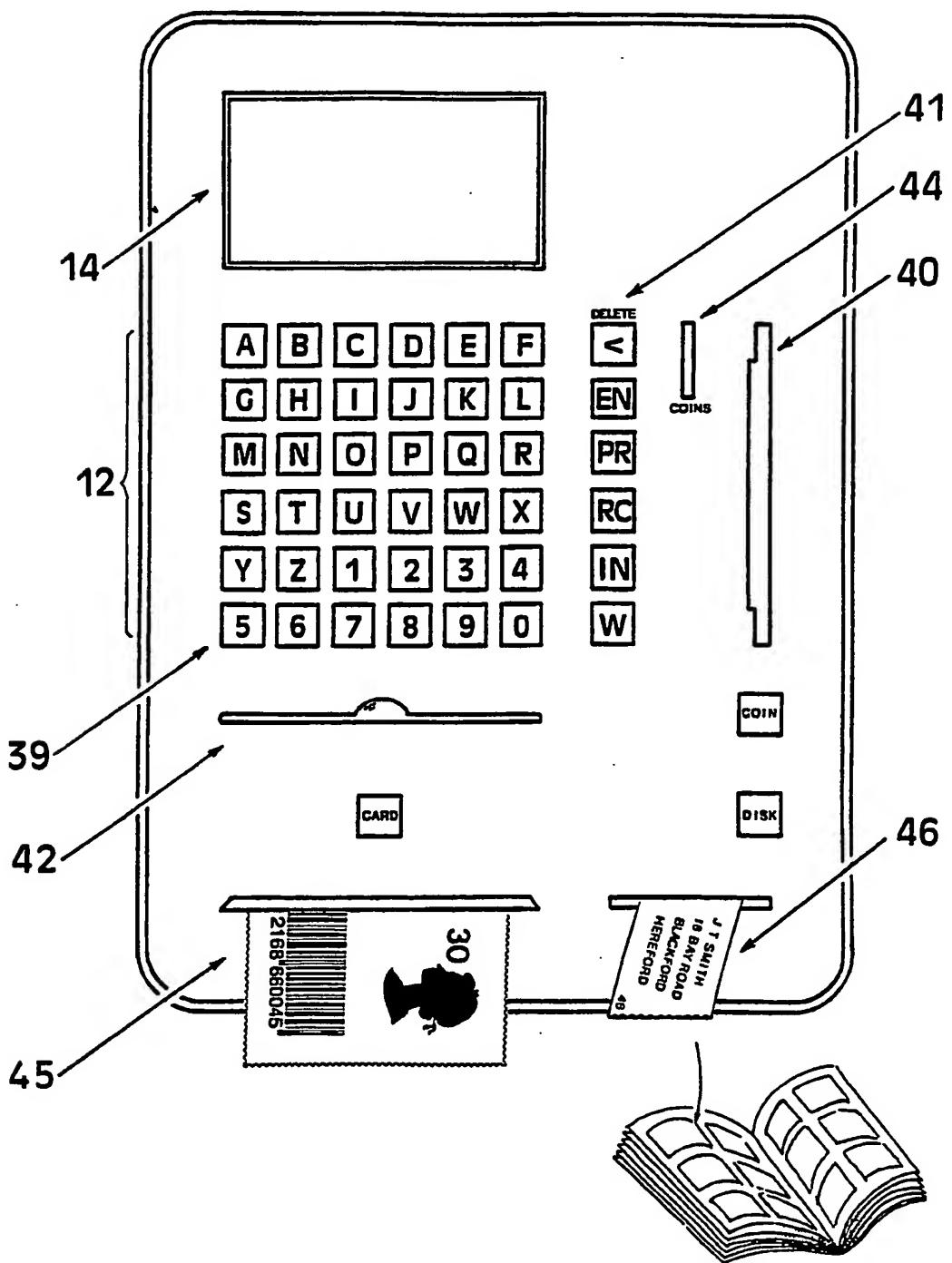


Figure 2

3/3

Figure 3

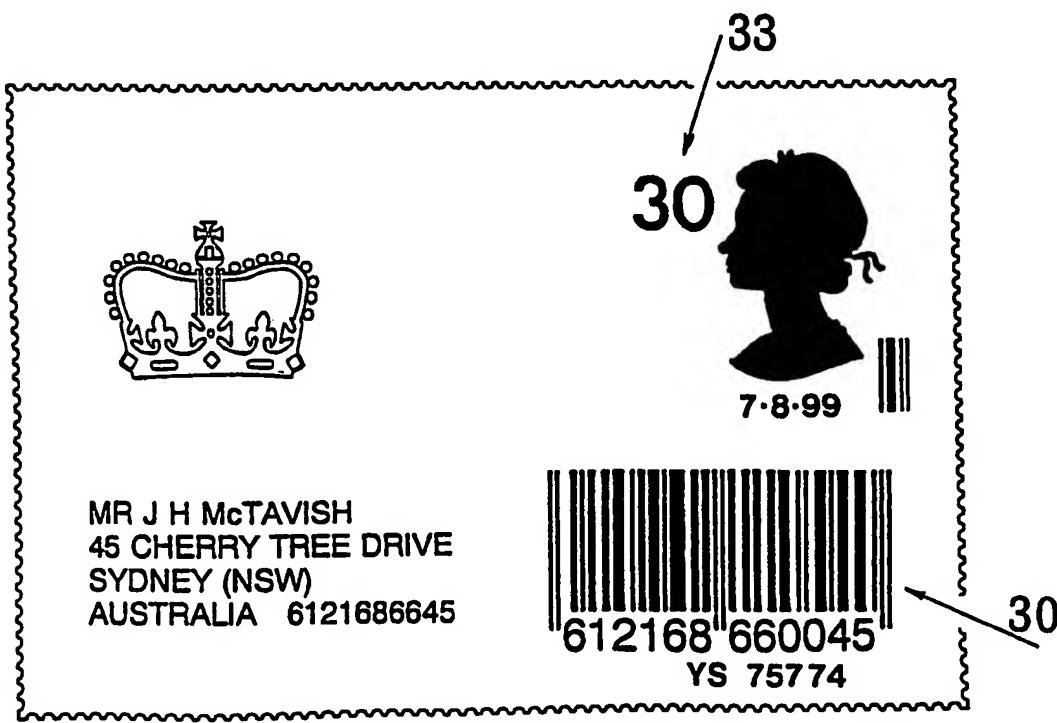
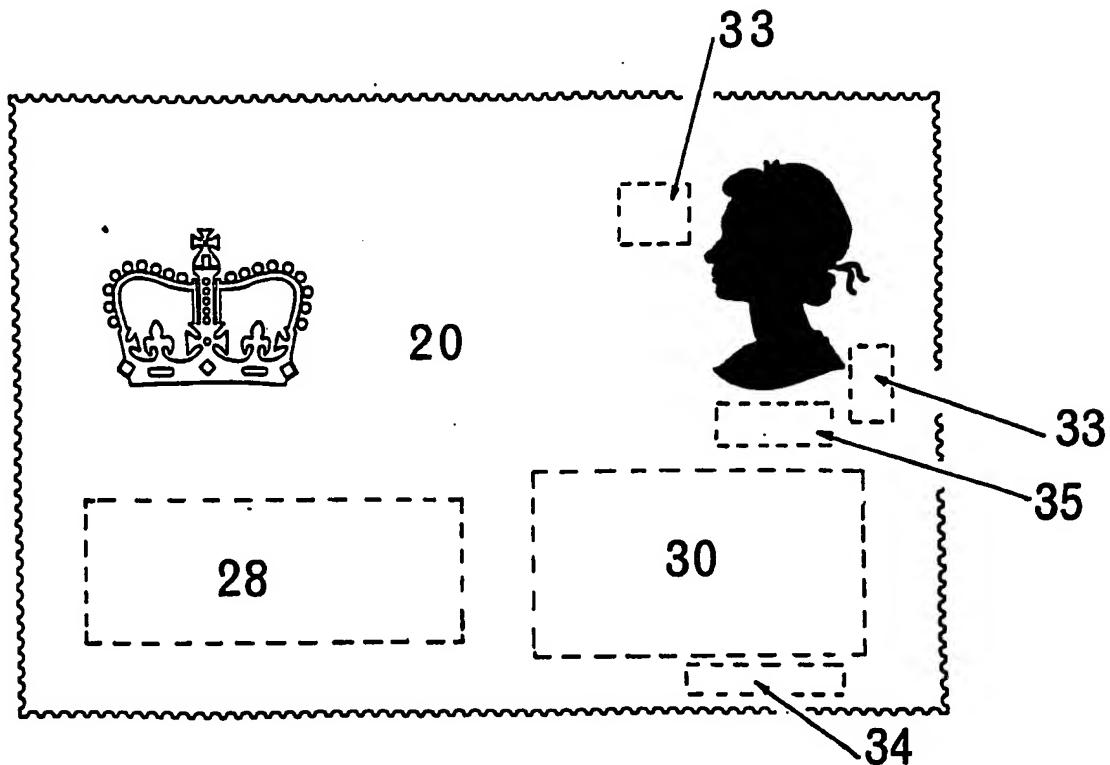


Figure 4

Mail Source Encoding Device

The present invention relates to an integrated postage-stamp encoding and vending device, which on input of an address to which mail is to be sent, determines the postcode from the address using an address code database, weighs the mail item to determine the postal rate, and on receipt of monitory credit or automatic debit, prints the unencoded address, postcode, date and other information, together with an encoded version, on an otherwise conventional postage stamp, and then dispenses the stamp for attaching to the mail. The sealed device then communicates the codes of the stamps issued via a telephone or other cable link to the postal service for checking against the codes read by the first line sorters. Thus enabling the encoding of all mail at source so that it can be read and sorted automatically, and tracked electronically.

In already established mailing systems optical character recognition (OCR) machines are used to read addresses hand-written or typed by the sender and are sorted and encoded by the machines for subsequent automatic sorting by down-line sorters. OCR machines fail to read much of the mail however and human operators are required to visually read and encode these items individually via a keyboard.

In some countries commercial organisations encode their mail at source by printing the post code as a bar code on each envelope which is then read automatically by OCR sorting machines. Some systems also use a postcode database either in the form of a ROM or are interactively linked to a central database for individually encoding mail.

Customer postcode barcodes are currently available in the U.K. and elsewhere for users to type/print onto labels, envelopes or letters with see-through envelopes. These are read by OCR sorting machines and secondary codes are then printed onto the items for down-line sorting. Their use is dependent on the customer having a computer/word processor/printer with the necessary font and access to an address/postcode dictionary database. Customer codes do not encode the postal rate, customs information or constitute a stamp and are located separately from stamps that require franking. In the case of letters the codes either have to be read through transparent windows or can be obscured by misfolding.

No such system is currently attractive to private individuals or small businesses necessitating presorting and OCR or manual reading and encoding of mail from these sources.

Bar codes using the relative width of standard length bars are available with algorithms for both numeric and alphanumeric representation, and are used worldwide for encoding a vast range of items. Fast, single-scan laser readers for them are also widely available.

Variable-length barcodes are however used instead for encoding mail in the U.S. and the U.K. The U.S. Postal service uses a two-state, and the U.K. Royal Mail a four-state bar code, requiring sophisticated reader-sorter equipment not available or likely to become available in many parts of the world.

For these reasons, and to achieve fast fully automated sorting, a universally standardised encoding system and unsophisticated

equipment to enable and persuade all customers to source encode their mail, would clearly be advantageous.

5 Patent GB 1383518 discloses a vending machine capable of encoding stamp/labels with the post/zip code for attaching to envelopes on input of the post code and service mode (e.g. Air Mail) from a keyboard, that also weighs the package and calculates the postage from the weight, and requires input of appropriate coinage before dispensing the stamp/label.

10 The above vending machine however is dependent on the user putting the overt address on the envelope for human recognition at final stage delivery, requires the user to know the correct postal code, does not cater for credit card users or electronic credit, and does 15 not provide a readily reusable hard copy or electronic record of the overt or encoded address.

20 Patent GB 2174039 discloses a device for printing and authenticating postage and address information in both human readable and encoded form on a label or in the address field of an envelope as a development of the commercial franking machine.

25 This device does not however provide an encoding or postcode determining service for the home user or for the public conventionally purchasing stamps in a post office or from a public vending machine, nor does it provide an integrated postcode retrieval service for national and international codes for the commercial user, and does not retain the concept of the traditional stamp.

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The present device however integrates and provides all the services the customer requires to send mail that can be automatically sorted to a destination address, knowing only the name and address of the recipient and can be used for the purchase of just a single encoded stamp.

5 The present device also enables the traditional stamp format, with its philatelic attractions, to be maintained. The stamp dimensions have to be somewhat increased to accommodate the overprinted information in legible form, but otherwise the stamp can still be used to depict attractive visual information as at present.

10 The present invention comprises three complementary devices, one for home, one for business, and one for public use that overcome the above drawbacks.

15 It is preferred that all three variants of the device print the overt address, postal rate and other information, as well as the encoded data, on a postage stamp, or on a label dispensed with and integral to the stamp.

20 Purchase of a stamp from one of the devices automatically entitling the sender to the facility for printing the recipients name and unencoded address as a standard typeface and in an encoded form on the stamp or associated label.

25 The facility being made available on keypad, notepad, voiceprint or electronic entry of the overt address, without the need to know the postcode, the latter being retrieved from a data base as part of the service.

The advantages of this method to a postal service, over openly available customer codes, being that the size, position, background reflectance and quality of printing of the codes would be tightly controlled by the postal service/licensee, and the incidence of incorrect or missorted codes reduced to negligible proportions.

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A further advantage being that the codes or even the encoding algorithms may be changed without having to involve the customer. This is possible because even in the case of the commercial version of the device the encoding and printing of the information on a stamp is carried out independently of a customers word processor.

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With this device the time now taken to OCR or manually read the address, postcode or customer code, and encode and print the secondary codes, may be passed back to the customer end, thus standardising, simplifying and speeding up mail-sort operations.

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Furthermore the stamps once vended are effectively tagged and can be backtracked electronically to facilitate detection of forgeries and unauthorised reuse.

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Since customers frequently move their residence/address, those customers notifying the postal service of a redirection change may be catered for by updating the worldwide database and flagging changes of address to device owning/using customers attempting to use the old address.

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The advantages of this method to all potential customers are firstly that there is no longer any need for the customer to know the destination postcode, at any stage, since this is automatically

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retrieved from the database and encoded on the stamp as part of the service.

5 Secondly there is no need to write or type the overt address on an envelope, package or separate label, as the stamp has the overt address printed clearly on it.

10 Thirdly the customer has the option of having any keyboard, notepad or voiceprint entered names, addresses and codes electronically recorded for later reuse without reference back to the central 15 database.

In the present invention there is provided a mail encoding device comprising a means for entering an address to which mail is to be sent together with other information, a database of codes, or on-line access to a database of codes, an encoder which translates the address and other information into a standard machine readable code, a printer for printing the unencoded address and the code on a stamp, a supply of stamp blanks, a means of electronically recording 20 the information, and of debiting the customer.

As each stamp is issued by the device, its unique code may be temporarily stored by the device for subsequent transmission to local sorting offices by an on line link (e.g as a batch file at the 25 end of each day), where it may be stored either in a customer or a common file, as required, for elimination from the record once the stamp is detected by a first line sorter. Any excess coded stamp records accumulated by the sorters alert the post office to possible forgery or reuse. Any shortfall simply represents issue of stamps 30 that are not used, are delayed or have been posted in a different

postal district. Transmission of residual excess codes to other sorting offices in a network out from the postal district in which a code is generated will eliminate those posted in surrounding districts.

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The code may be a digital or alphanumeric code and there are several ways in which an address could be represented. One way would be to use the postcode or zipcode as a representation of the address for translation into all or part of a machine readable code. This would be particularly useful for national mail. A system that would be useful for representing both national and international mail would be to use all or part of an addressee's telephone number as an address code. The standard international dialling codes would determine the country and larger cities to which international mail would be sent, whilst for national mail later parts of the telephone number could be used to designate the district and street of the address and be retranslated and resorted as required by a microprocessor integral to the destination sorter.

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A third way of representing an address would be to use a hybrid between the international dialling code and the national post code as preferred by the postal service of each country.

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Several countries now have their own systems of postal/zip encoding mail at source. Senders of mail from abroad however may not have access to the correct codes for a given destination address, and many internal senders of mail either do not have access to, or introduce errors into established codes (e.g. U.K. Post Codes).

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Therefore if this type of code were used, it would be possible to

set up one or a series of international electronic databases containing address codes for every country, in parallel or in conjunction with the telephone directory enquiry service. It would also be possible to include correct postal or zip codes in the 5 database so that when an address is entered, the correct postal code is automatically retrieved from the database and added to the address during the encoding process.

U.K. postcodes are currently available both in disk form and on line 10 access. With present technology it would not however be economic to supply these for every home user, but they could be integral to the public vending machines.

On a worldwide basis the database would be very extensive and with 15 current storage and access limitations would have to be centralised. Large postal service computers using, for example, high capacity CD-ROMS for the postcode dictionaries, could however be accessed on line by cable link to the stamp encoding and vending machines. Local postcodes could be held on CD-ROMS in local postal districts, also 20 linked to vendors by cable, the central database being used for international addresses.

The efficiency of the service would increase rapidly shortly after 25 introduction if customers are given the option of storing the address codes on disk that they require to use again, without additional charge. Since, within a short time most customers would have retrieved the bulk of the codes that they need to use.

Therefore it is preferred to provide an encoding device according 30 to the invention equipped with an integral ROM holding a database,

or/and online access to an interactive database of international address codes, which may be of the type just mentioned. A CD-ROM integral to the device could supply codes for local addresses and the remote database could be used for international or remote national codes.

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A preferred type of code which may be used to represent an address and other information would be a variable width bar code of the type commonly used in supermarkets, since read heads for this type of code are widely available and could be readily interfaced to mail sorting equipment throughout the world.

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In order to avoid errors in the addressing of mail, the device preferably includes a display, for example a LCD or LED display so that the address can be checked before it is encoded. The device may also print out the unencoded address so that it can be read by the sender and by the person who delivers the mail.

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It is particularly useful if the coded information, and if used the unencoded address, is printed on a stamp or stamp associated label and therefore in one embodiment of the device, a cassette of stamps or stamp plus associated labels may be connected to the device. The cassette of labels may comprise an integral memory chip preprogrammed with data representing a certain amount of prepaid money. In this case the device may comprise means for encoding a postage rate in addition to an address and subtracting this postage rate from the amount in memory, which may be embodied in the chip. A ROM containing various postal rates and customs data for different destinations may also be connectable to the device for updating of postal rates. If embodied in the cassette of blank stamps, the rates

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may be automatically updated on purchase of the next cassette.

When this type of encoding device is used, the stamp may include an indication that the postage has been paid and the amount of postage, 5 for example the stamp may be printed by the device with an unencoded or/and encoded indication of the amount of postage that has been paid and the date of issue.

It is envisaged that individual encoded stamps or cassettes of stamp 10 blanks would be on sale at post office counters but it would also be possible to supply them from cassette dispensing machines of the similar type as those used to dispense books of stamps.

In a further version of the device for commercial organisations, the 15 cassette of stamps may be supplied, and debiting of the customers account for the value of the stamps used may take place automatically, at intervals, via the interactive link to the licensing authority, as with current modern franking machines.

.20 In order to discourage forgery and reuse of stamps the device may be connected to a remote monitoring station by a cable such as a telephone cable or fibre-optic link and a record of the unique code printed on each stamp transmitted in batches to the monitoring station.

25 At the monitoring station which may be a sorting office the codes may be stored in a customer file and the codes may be retrieved from the file and compared with the list of codes read by the first line sorter. Matching codes may be eliminated from the file leaving only 30 those codes and their associated mail that have not been posted. Any

excess codes detected by the sorters suggesting possible fraud.

- 5 The device may also comprise a RAM containing an "address book file". If a RAM is used, it may either be integral with the device or as a detachable disk depending on the number of addresses required. This file may be used by the customer to store addresses and their codes retrieved from the database for later use, calling them back by either scrolling on the display or by input of a reference number.
- 10 A further feature which may be included is a weighing plate which may be integral to, or connected to the device. This would enable the correct postage value to be chosen by the sender for packages and parcels.
- 15 For private users not wishing to use a keypad, one optional variant might be a notepad, consisting of a digitizer board segmented into separate domains, each overlain by a box outline for inputting letters or numbers one at time using a freehand stylus. An OCR chip would then recognise each symbol and display the interpreted version on the display for checking. Similarly a microphone and voice recognition chip could be used by the disabled to input the letters and numbers one at a time.
- 20 Other versions of the device may be available to commercial organisations. They may be in the form of add-on devices to their weighing and franking machines, or word processors may be interfaced to the device so that every time a letter is typed, there may be the option of calling for an address encoded stamp.
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The preferred commercial version of the device would remain separate from the customers word processors, other than to receive unencoded addresses from the processor for which encoded stamps are required, or to input addresses, and previously obtained codes, from a dedicated mailing database in electronic form.

In a second embodiment, the device may further comprise a vending machine for the supply of encoded stamps. As for the first embodiment, the device may comprise means for encoding a postage rate and a ROM or other memory, or on-line access to a memory containing address codes, various postal rates and customs data for different destinations. The second embodiment of the device also preferably is integral with or linked to a weighing plate and the stamps used in this embodiment are preferably identical or very similar to those used in the first embodiment. The second embodiment would be used in a similar manner to the first embodiment except that, when the user has input the address, the correct postage rate is calculated by the machine and, in order to obtain an encoded stamp, the user must either insert money or a cash or credit card as with a conventional vending machine. The device of this embodiment can be situated in a public place and can thus be used in a similar manner to conventional stamp vending machines. However, the device does of course have the advantage that it produces a stamp overprinted with the unencoded address and an encoded version of it.

In this second embodiment the stamps vended may be of several different types according to postal value as at present, or a standard stamp blank may be overprinted with the postage paid.

In a second aspect of the invention there is provided a decoder for

reading the code applied by the device described above and comprising one or more laser readers.

In the preferred form of reader a square matrix of stationary laser beams would be set at a slight angle to the motion of the mail items such that several beams would scan every barcode on an item irrespective of its angular position on the mail. The entire matrix plane would also be set at an optimum reflection angle to the mail flow. The information from several beams would then be compared to arrive at a consensus for the read. A duplicate set of laser readers on either side of the mail train would avoid the necessity for the mail to be all the same way round, and a parity check built into the barcode algorithm would enable the code to be read back to front for upside down mail. An edge weighing device would check on the weight of the item and the sorter computer would check this out in terms of the destination and postage paid.

For parcels and packages, the sorter may comprise a tumbler for tumbling mail until the code faces the laser reader, and the laser reader may be on a mechanical arm which is guided by computer to a stamp which may be preprinted with a pigment that fluoresces under U.V. and is detected by a simple photocell array.

Each stamp may be detected by a two-dimensional array of photocells which detect the position and orientation of the stamp by its fluorescence under U.V. and guide the laser reader mounted on a mechanical arm, which can move up and down in a plane in front of the passing mail, and rotate on its axis to present the optimum scan angle to read the bar code on a stamp. If the automated scanning fails, parcels may be ejected onto a conveyor, where an operative

manually scans the barcode with a hand held scanner on a flex.

A specific embodiment of the stamp dispensing and encoding device according to the invention will now be described by way of example only, with reference to the following drawings wherein:

Figure 1 is a perspective view of a stamp dispensing and encoding device according to the invention with a cassette of labels attached:

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Figure 2 is a front view of an alternative embodiment of an encoding device according to the invention.

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Figure 3 is a view of a stamp blank before overprinting; and

Figure 4 is a view of a stamp overprinted by the device of the invention.

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One embodiment of the invention is shown in Figure 1 which illustrates a dispensing and encoding device 10 having a keypad 12, an LCD or LED screen 14 and a printer 16. A sealed cassette 18 containing stamp blanks 20 can be plugged into the device 10 at 30. Overprinted stamps 36 are ejected from the device at 37. Integral with the cassette 18 is a chip 22 which has a memory in which is stored a value representing an amount of money for the payment of postage, and the current postal rates and customs data.

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A detachable RAM disk 26 for recording addresses and their associated codes, or for inputting addresses and their codes can also be attached to the device 10, and a detachable weighing plate

38 may also be attached if required.

The stamp blanks 20 as shown in Figure 3 have a space 28 in which the human readable unencoded address can be printed, and further spaces 30 and 31 in which barcodes are printed, 33 and 31 in which the postal rate is printed, 34 where the user I.D. is printed, and 35 where the date is printed. The stamp blanks 20 have a preprinted design as in conventional stamps. The stamp blanks are either printed on a roll, coated on the back with a moisture activated adhesive, and separated by perforations as in conventional stamps, or alternatively are coated with sticky adhesive and covered by a peel off backing.

By way of example only, the overprinted stamp shown in Figure 4 has a barcode 30 based on the international telephone dialling code, 61 being the code for Australia and 2 the code for Sydney. The rest of the code is a fictitious postcode for the street and house number to enable the destination sorter to layout the mail in round order.

To use the device 10, it is first of all connected to a supply of electricity and to a telephone line via a modem, and a cassette 18 of stamp blanks 20 is attached to the device 10. In order to print the address and other information on a stamp for affixing to a package, a user types in the address using keypad 12 without needing to know the postcode. The address is displayed on screen 14 and is checked for errors. The display 14 shows a message asking if the address is correct and if the user replies that it is, the device then instigates a search for the address in a database of towns and streets on an integral CD-ROM, and if found retrieves the code. If the address is outside the area the device then opens a line via a

modem to a postal service database to retrieve the code. On successfully retrieving the code it is displayed along with the address on screen 14 and the user is asked to input the weight of the item. An optional weighing plate 38 connectable to the device 10 may alternatively automatically input the weight. The appropriate postage for each of the available modes, such as first or second class, airmail or surface mail is then displayed on screen 14 and the user chooses the mode required. These values are stored in the ROM integral to the chip 22 embodied in the cassette of stamp blanks.

The screen 14 then automatically displays details of any customs information required and requests input. Once the data has been input a "code and print" key causes a stamp 20 to be fed from a slot in the sealed cassette 18 at 30 and printed with the postage rate, the address and postcode, the main barcode, the user I.D., and any customs data as a subsidiary barcode to the main code. Finally, the display asks the user if the address and its code should be recorded on the detachable disk 26. Once saved the addresses and their associated codes can be recalled by inputting a reference number or by scrolling them on the display 14.

As the overprinted stamp 36 is ejected from the device 10 at 37, the correct postage is debited from the total value stored in chip 22. Therefore the number of stamps which can be issued from the sealed cassette 18 will not necessarily correspond to the number of stamp blanks in the cassette. It is envisaged that it would be possible to return used cassettes to the supplier in return for a rebate. Finally the on line link sends the data coded on the stamp via the telephone line to the local sorting office for its security check.

At the initial sorting depot the laser scans the barcode and detects a non-zero first digit indicating that the destination is outside this country and sorts the item to the overseas bin. The sorter for overseas mail reads the 61 as Australia and consigns it to the bin for Australia. In Australia the initial sorter reads the 612 as Sydney, and the Sydney sorter then reads on to utilise the rest of the code.

An alternative embodiment of the device is shown in Figure 2. As for the embodiment of Figure 1., this device also has a keypad 12 consisting of alpha numeric keys 39 and command keys 41 and a LCD or LED screen 14 similar to that of the first embodiment. It is also connected to or integral with a weighing plate (not shown) and has access to CD-ROMS with both national and international address/postcode databases. It also has the latest postage rates and customs requirements data available in electronic form. However, in addition, the device of this embodiment also has a disk slot 40, a card slot 42 and a coin slot 44.

In order to use the device, the user places an item of mail on the weighing plate and presses an appropriate command key 41 so that the weight of the mail is registered. A prompt then appears on the screen 14 which asks if the user wishes to import an already coded address from a disk. If the user inserts the disk, an address previously stored in both unencoded and coded form can then be selected. Alternatively, if no disk is inserted or the address required is not on the disk, an address can be input using the keypad 12, and on pressing a further command key 41 the search of the database for the matching postal code will be initiated. If the address is local an integral CD-ROM may be searched, or if the

address is in an overseas country, a line may be opened via a modem to a central data base. On retrieval of the corresponding postal code the device then computes the appropriate alternative postage rates and displays the types of service available (e.g. first class, second class, airmail, surface mail), with the cost of each of these options. Once one of the options has been selected, if any customs information is required the user is prompted to insert the information by the keypad 12. On completion the user is further prompted to either insert money in the coin slot 44 or insert a cash/credit card into the slot 42. Following correct payment being debited, a command to print is requested and a stamp blank is overprinted with the unencoded human readable address and post code, postage value, date and vendor I.D. code, together with a machine readable variable-width barcode version of the same information and the stamp is ejected from slot 45. Any customs data is printed as a subsidiary barcode.

On completion of the transaction the user will be prompted on screen 14 with the choice to use the record option so that both the unencoded and encoded form of the address can be saved on disk, for later use on the same or another vending machine, or the home version of the device, and will be asked to give the record a number. When used again the transaction will be speeded up as the code will not have to be retrieved from the database. If the address is saved, a sticky-backed minilabel 46, with the address and the number assigned to it printed on it, is dispensed as a record for keeping in a conventional address book. The user then has the option of printing a further stamp or of ending the transaction.

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At the sorting depot, the coded address and any other information
are read by a laser scanner, and the code is stored in a computer
file for checking against the files of codes imported via the cable
link to the stamp vending versions of the device in the local postal
district.

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CLAIMS

1. An integrated postage stamp dispensing and encoding device comprising a means of entering an address to which mail is to be sent and other relevant information, a means of determining the weight of an item of mail to which the stamp is to be affixed, to determine the postage rate, a means of obtaining the address and other information in standard coded form from a database. An encoder for translating the coded information into machine readable form, a printer for printing the address and other information in both unencoded and machine readable form on a postage stamp, a means of debiting the user, a means of recording the information printed on each stamp, and a means of independently communicating the information encoded on the stamp to local sorting machine associated computers for authentication and detection of fraud.
2. A device as claimed in claim 1 wherein the means of entering the address comprises a keypad and/or a notepad, or voiceprint or a link from a word processor or/and a RAM or other form of memory.
3. A device as claimed in claim 1 or claim 2 wherein the machine readable code is a bar code or a digital or alphanumeric code.
4. A device as claimed in any one of claims 1 to 3 wherein the encoder firstly translates the address and other information into a digital or alphanumeric code and then translates it into a bar code.
5. A device as claimed in claim 3 or claim 4 wherein the digital or alphanumeric code represents the address by all or part of a telephone number or postal code.

6. A device as claimed in any one of claims 1 to 5 equipped with access to a ROM or other memory containing a database dictionary with national and/or international address codes.
- 5 7. A device as claimed in any one of claims 1 to 6 equipped with access to a telephone cable, optic fibre cable or other interactive link to a remote database for retrieving national and/or international address codes.
- 10 8. A device as claimed in any one of claims 1 to 7 further including a display, which may be a LCD or LED or other electronic display, for checking the input of letters and numbers comprising the name and address and other information input via keypad, notepad, voiceprint, word processor, or RAM.
- 15 9. A device as claimed in claim 1 or claim 2 wherein the notepad comprises an electronic digitizer pad consisting of separate domains for inputting individual letters and numbers of the address and other information using a freehand stylus.
- 20 10. A device as claimed in claim 9 wherein the digitizer pad is overlain by a printed or otherwise evident pattern of boxes for entering the address to which mail is to be sent, and other information, as separate letters and numbers, each box corresponding to the pad domains.
- 25 11. A device as claimed in claims 9 and 10 with a means of recognising the freehand letter or number input using the stylus in each box/digitizer domain.
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12. A device as claimed in claim 1 and claim 2 comprising a microphone and voice recognition module, herein referred to as voiceprint, for inputting the address to which the mail is to be sent, and other information, as spoken letters and numbers.

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13. A device as claimed in any one of claims 1 to 12 wherein the unencoded name and address, date of dispensing, user identification code, postal rate and customs information may be printed as required on a postage stamp as well as the same information as required in machine readable form.

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14. A device as claimed in any one of claims 1 to 13, further including a cassette containing stamp blanks and comprising an integral chip representing an amount of money.

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15. A device as claimed in claim 10, further comprising means for encoding a postage rate for the package to be mailed and subtracting this postage rate from the amount on the chip.

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16. A device as claimed in any one of claims 1 to 16 further comprising a disc or other RAM containing an "address book file".

17. A device as claimed in claim 13, wherein the stamp blanks are supplied from a vending machine integral with the device.

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18. A device as claimed in claim 17, further comprising integral means of storing postal rates and customs data for different destinations.

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19. A device as claimed in any one of claims 1 to 18, wherein a weighing plate is connected to the device.
- 5 20. A device as claimed in any one of claims 17 to 19 wherein the printing and vending of a stamp is withheld until the user has satisfied the postage by inserting sufficient coinage, or a cash/credit card have been debited.
- 10 21. A device as claimed in any one of claims 1 to 13 wherein the printing and dispensing of a stamp causes automatic debiting of the senders account for the appropriate postage.
- 15 22. A device as claimed in any one of claims 1 to 21 wherein the code allotted to a stamp and the identification code of the vendor are transmitted either individually or in a batch to one or more mail sorter associated computers to authenticate each stamp and detect possible fraudulent use of stamps.
- 20 23. A device as claimed in claim 21 and claim 22 wherein the cable link serves the triple function of providing a 2-way interactive link to a central address/postcode database, a one-way link to sorter associated computers, and a direct debit link for licensed customers.
- 25 24. A decoder comprising one or more laser readers connected to a sorter and an associated computer, for sorting mail according to destination, and for storing codes, read on the encoded stamps attached to the sorted mail, in memory.

25. A decoder and associated computer as claimed in claims 22 to 24 wherein the computer also receives codes by cable from the stamp encoding devices and also stores these codes in memory.
- 5 26. A decoder and associated computer as claimed in claim 25 wherein the codes received from the stamp encoding devices and stored in memory that match those codes received from the laser readers, are deleted from memory.
- 10 27. A computer as claimed in claim 26 which transmits the codes read on encoded stamps by the laser sorter that cannot be matched within a 48 hour period, to other local sorting office computers, in an expanding network.
- 15 28. A method as claimed in claims 22 to 27 wherein those codes read by laser sorters that cannot be matched by codes transmitted to the network from stamp encoding devices, are accumulated in memory, and flagged for investigation.
- 20 29. A decoder as claimed in claim 24 further comprising a mail item weighing device.
- 25 30. A decoder and associated computer as claimed in any one of claims 24 to 29 wherein the individual weight data at the time of sorting is compared with the postage and destination data encoded on the stamp, attached to each item of mail, to detect stamps fraudulently attached to the wrong item.
- 30 31. A decoder as claimed in any one of claims 24 to 30 wherein a grid of parallel, stationary laser beam scanners in a plane parallel

to the stamps on the mail, are set at a slight angle to the motion of mail items passing on a speed controlled conveyor, such that several beams scan the barcode on an item of mail irrespective of the barcode's angular position on the item.

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32. A decoder as claimed in claim 31 wherein the information from several laser beams is compared by computer to arrive at a consensus read of the barcode data.

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33. A method as claimed in claims 31 and 32 wherein the process comprises an initial step of tumbling package and parcel mail to bring the barcode in opposition to the scanner.

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34. A method as claimed in claims 31 to 33 wherein once a fluorescent dye in the stamps has been detected by an array of photocells under U.V. illumination, a command is issued to cease tumbling, and the coordinates of the stamp are signalled to the sorter computer.

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35. A method as claimed in claims 31 to 34 wherein the laser scanner array is mounted on a mechanical arm that can move in a plain up and down above the mail and home in on the barcode, under computer guidance in the X,Y plane, and under ultrasonic rangefinder guidance in the Z plain, and finally rotate on its axis to optimise the position for scanning the code on a package or parcel.

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Patents Act 1977
 Examiner's report to the Comptroller under Section 17
 (ie Search report) 26

Application number
 GB 9319799.4

Relevant Technical Fields

- (i) UK Cl (Ed.L) G4H (HGM HDW HDC HDD HDR HDS
 HDT HDU HDV) B6F (FAB FAC FAD FAE
 FAF FAG FAH), B8F (FBG)
- (ii) Int Cl (Ed.5) B07C 3/00 3/18, G06K 1/12, G09F 3/02

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Search Examiner
 M J DAVIS

Date of completion of Search
 3 NOVEMBER 1993

Documents considered relevant
 following a search in respect of
 Claims :-
1 AND APPENDANCIES

Categories of documents

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| X: | Document indicating lack of novelty or of inventive step. | P: | Document published on or after the declared priority date but before the filing date of the present application. |
| Y: | Document indicating lack of inventive step if combined with one or more other documents of the same category. | E: | Patent document published on or after, but with priority date earlier than, the filing date of the present application. |
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Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2193160 A	(THORN EMI) whole document	1 at least
X	GB 1383518	(GUNN) whole document, noting page 1 lines 124-126 ("label")	1 at least
X	WO 89/01831 A1	(MIKHAIL) whole document	1 at least
X	US 4201339	(GUNNE) whole document	1 at least
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